

What is claimed is:

1. A magnetic resonance imaging system comprising:
MT-pulse applying means for applying to an object an MT
pulse of which is off-resonance to a region to be imaged of the
5 object;

spoiler applying means for applying a gradient spoiler pulse
to the object after the MT pulse is applied; and

scanning means for performing a scan to acquire an echo
signal from the region to be imaged after the gradient spoiler pulse
10 is applied,

wherein a duration of the MT pulse is set to a short time.

2. The magnetic resonance imaging system according to
claim 1, wherein the duration of the MT pulse is less than 10
15 [msec].

3. The magnetic resonance imaging system according to
claim 2, wherein the duration of the MT pulse is 6 [msec] or less.

20 4. The magnetic resonance imaging system according to
claim 1, wherein the MT pulse is, in a waveform area,
approximately equal to a conventional MT pulse of which duration
is longer.

25 5. The magnetic resonance imaging system according to
claim 1, wherein the MT pulse is, in a waveform area, less than a
conventional MT pulse of which duration is longer.

6. The magnetic resonance imaging system according to

claim 1, wherein the scanning means is configured to two-dimensionally scan the region to be imaged on the basis of multi-slice imaging.

5 7. The magnetic resonance imaging system according to claim 1, wherein the scanning means is configured to three-dimensionally scan the region to be imaged on the basis of multi-slice imaging.

10 8. The magnetic resonance imaging system according to claim 7, further comprising region selecting means configured to apply, concurrently with the application of the MT pulse, a gradient pulse to select an applied position of the MT pulse to the object so that the applied position of the MT pulse is different from
15 the region to be imaged.

 9. A magnetic resonance imaging system comprising:
 MT-pulse applying means for applying to an object an MT pulse of which is off-resonance to a region to be imaged of the
20 object;

 spoiler applying means for applying a gradient spoiler pulse to the object after the MT pulse is applied; and

 scanning means for performing a scan to acquire an echo signal from the region to be imaged after the gradient spoiler pulse
25 is applied,

 wherein a duration of the MT pulse is set to a short time during which relaxation of a spin-lattice magnetization of a magnetic spin of the object is hardly completed.

10. The magnetic resonance imaging system according to claim 9, wherein the duration of the MT pulse is less than 10 [msec].

5 11. The magnetic resonance imaging system according to claim 10, wherein the scanning means is configured to two-dimensionally scan the region to be imaged on the basis of a multi-slice technique.

10 12. The magnetic resonance imaging system according to claim 10, wherein the scanning means is configured to three-dimensionally scan the region to be imaged on the basis of a multi-slice technique.

15 13. The magnetic resonance imaging system according to claim 12, further comprising region selecting means configured to apply, concurrently with the application of the MT pulse, a gradient pulse to select an applied position of the MT pulse to the object so that the applied position of the MT pulse is different from
20 the region to be imaged.

25 14. A magnetic resonance imaging method for acquiring an echo signal on the basis of magnetic resonance phenomena of at least two types of nuclear pools in an object, the two types of nuclear pools being mutually coupled through a coupling relationship based on at least one of a chemical exchange phenomenon and a cross relaxation phenomenon, the method comprising the steps of:

decoupling the coupling relationship between the at least

two types of nuclear pools by applying to the object an MT pulse of which duration is short;

applying a gradient spoiler pulse to the decoupled nuclear pools; and

5 acquiring the echo signal from a region to be imaged of the object.

15. The magnetic resonance imaging method according to claim 14, wherein the two types of nuclear pools consist of a
10 nuclear pool of free water and a nuclear pool of a macromolecule.

16. The magnetic resonance imaging method according to claim 15, wherein the echo signal from the region to be imaged is acquired by a two-dimensional scan based on multi-slice
15 imaging.

17. The magnetic resonance imaging method according to claim 15, wherein the echo signal from the region to be imaged is acquired by a three-dimensional scan based on multi-slice
20 imaging.

18. The magnetic resonance imaging method according to claim 17, wherein, concurrently with the application of the MT pulse, a gradient pulse is applied to the object so as to select an
25 applied position of the MT pulse to the object so that the applied position of the MT pulse is different from the region to be imaged.

19. The magnetic resonance imaging method according to claim 14, wherein the duration of the MT pulse is less than 10

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	